

## REMARKS

This is intended as a full and complete response to the Office Action dated August 29, 2003, having a shortened statutory period for response with a one month extension set to expire on December 29, 2003. Please reconsider the claims pending in the application for reasons discussed below.

Paragraphs 21-25 and 34-37 of the specification have been amended to correct minor editorial matters.

In Figure 2, element numeral 208 has been added. In Figure 3, element numeral 330 has been added. It is believed that the specification and drawings as filed support this amendment. Entry is respectfully requested.

Claims 1-21 will be pending in the application upon the entry of this response. Claims 1-20 stand rejected by the Examiner. Claims 1 and 11 have been amended to clarify the invention. Claim 21 has been added. Reconsideration of the rejected claims is requested for reasons presented below.

Claims 1-3, 5, 7-13 and 15 stand rejected under 35 USC § 102(e) in view of U.S. Patent No. 6,524,461 (*Taylor*). The Examiner asserts that *Taylor* discloses the claimed method of electroplating copper comprising the use of a plurality of pulses, including the electrodeposition, electrodisolution and a time interval of zero electrical pulse separating each cycle. The Examiner states that the claims are anticipated since *Taylor* discloses each and every limitation. Applicant respectfully traverses the rejection.

*Taylor* discloses a method to deposit metals on a substrate by alternating cathodic pulses and anodic pulses. The cathodic pulses deposit metal while the anodic pulses remove metal. *Taylor* further discloses that the cathodic duty cycle should be relatively short, less than 50%, preferably 30% to 1%, while conversely, the anodic duty cycle should be relatively long, greater than 50%, preferably 60% to 99% (column 13, lines 12-26). Also, *Taylor* depicts cathodic pulses occurring with less duration than anodic pulses, as shown in Figure 1. *Taylor* does not teach, show or suggest a method for electroplating a metal on a substrate, comprising sequentially applying two or more cycles comprising an electrodeposition pulse followed by an electrodisolution pulse to

the substrate, wherein each electrodeposition pulse has a first time duration and each electrodisolution pulse has a second time duration equal to or less than the first time duration, and wherein the first time duration of each electrodeposition pulse of subsequently applied cycles remains the same or is reduced, as recited in claim 1, and claims dependent thereon. Also, *Taylor* does not teach, show or suggest a method for electroplating a metal on a substrate having a trench, comprising the steps of: (a) sequentially applying two or more cycles comprising an electrodeposition pulse followed by an electrodisolution pulse to the substrate, wherein each electrodeposition pulse has a first time duration and each electrodisolution pulse has a second time duration equal to or less than the first time duration, and wherein the first time duration of each electrodeposition pulse of subsequently applied cycles remains the same or is reduced, and (b) applying a DC current to the substrate to deposit the metal to a desired thickness on the substrate, as recited in claim 11, and claims dependent thereon. Therefore, withdrawal of the rejection and allowance of the claims are respectfully requested.

Claims 4, 6, 14 and 16 stand rejected under 35 USC § 103(a) in view of *Taylor*. The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the disclosure of *Taylor* to discover the optimum values for current density. The Examiner states that the current density is encompassed by the range disclosed in examples 1-11 of *Taylor*. Applicant respectfully traverses the rejection.

Independent claims 1 and 11 distinguish *Taylor* for reasons discussed above and are believed to be in condition for allowance. Claims 4, 6, 14 and 16 depend upon claims 1 or 11. Therefore, claims 4, 6, 14 and 16 are believed to be in condition for allowance. Withdrawal of the rejection is respectfully requested.

New claim 21 has been added and is believed to be in condition for allowance over *Taylor* and the other references of record. *Taylor* does not teach, show or suggest a method for electroplating a metal on a substrate, comprising sequentially applying two or more cycles comprising an electrodeposition pulse followed by an electrodisolution pulse to the substrate, wherein each electrodeposition pulse has a first time duration and each electrodisolution pulse has a second time duration equal to or less than the

first time duration, and wherein the first time duration is from about 500 millisecond to about 3,000 milliseconds, as recited in claim 21.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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